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10.0.B Discussion Evaporative Cooling Applications and Ice Making

Christopher F. Bauer
University of New Hampshire, chris.bauer@unh.edu

RECORDER REPORT, Chem 444A "Fire & Ice"

Group Member Name	Role	Date: 2/24
Emily Koester	Recorder	
Charles C	Spokesperson	
Taylor W	manager	
Marisa B	Reflector	

Discussion of Readings

1) Ice in warm climates: Taylor- Brand losing heat to the air.
M- earth must be letting off heat, Clouds would push it back down.
E & C- evaporation from water in the porous pots helps the water in the pots get cooler. The straw being dry was necessary to let air flow underneath.
M- thinks wet straw should help with evaporation

2) Bees: As water drops evaporate, cool air flows through the Hive. They leave the hive to allow for more air flow

Sweat: C- didn't know humidity of air impacts evaporation of sweat. *Similar to ice formation, evaporation cools what's left behind

Steam: M- steam has more energy than liquid water, which we now since the molecules are moving faster. The added energy makes steam more harmful to the skin than hot water.

Trees: E- As ice forms, molecules slows down. The energy must be converted to heat which it gives off to the trees. This helps protect the trees from cold temperatures.
C- seems counter intuitive. This the opposite of ice formation.

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Group Member Name	Role	Date: 2/24/15
Emily D	Recorder	
Heather P	Reflector	
Jon T	Manager	
Sean K	Spokesperson	

- General Consensus From Readings

  - Water ~~Ice~~ was able to freeze above 32°F because the perfect conditions were created for evaporation. This evaporation ~~used~~ requires energy and this energy came in the form of heat. Using this energy lowered the temperature enough for the water to freeze. The porous bowls create a situation similar to sweating.

  - Steam burns vs. boiling water burns, freezing trees/fruit, bee hives

  - common theme: phase changes involve a transfer of energy and this energy transfer can be utilized for either a cooling (evaporation) or heating (freezing) effect.

    - From Prof. Bauer: process is called evaporative cooling

Christopher F. Bauer, Principal Investigator.
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For Readings

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Group Member Name	Role	Date:
Amanda		
Nick		
Eliza		
Cale		

Test Trades:

- Water froze from evaporation
- Temperature would drop close to freezing and would allow the water to freeze
- Using the two extremes showed that the bigger change in temperature caused a quicker change in temperature.
- Makena's used (ex. shaw) to prevent heat radiating from the Earth affecting the process
- Would crush ice to compress it and then keep it from outside air to prevent from melting.
- Kind of like first air conditioner saying it could help the economy - created jobs (used 300 men, women, + children)

Common theme's

- phase change causes variation in temperature
- how phase change affects real life situations

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Group Member Name	Role	Date: 2/24
Samantha	recorder	
Miriam	spokesperson	
Becky	reflector	
Kyle	manager	

Group Recap of Readings

making ice -
made these pits, which were below ground level, and the atmosphere had to be dry to that the water could evaporate faster. They used dry straw and sugar cane to line the pits as well. They saw that rock salt was economical, and profitable. It was surprising that something so simple could make so much money.

steam

steam is more dangerous because it takes over 500 calories to convert it. when steam touches your hand it will be just as hot as the water. Overall, it took more energy to more dangerous.

Overall

→ In order for a substance to become a gas it needs to take in heat so it takes away heat from the environment it's in. So when it cools down it releases heat and gives off heat to the environment. For example, the fruit trees.

→ They explained while ice is freezing it is giving heat to fruit, but it didn't talk about what happens once the ice is frozen.

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Group Member Name	Role	Date: 24 Feb. 2015
Kaleigh Zakowski	Manager	
Tim Closson	Reflector	
Emma Addison	Spokesperson	
Mandy Graves	Recorder	

We all participated in the experiments and discussions last time. We could improve upon this by conversing more to try and figure out the concepts.

Readings Discussion:

Steam burns: steam is hot and has more energy than boiling water so the burns are more dangerous

Fruit trees: by applying water to trees, continuously throughout the winter to keep the trees at 32° F, because energy is used to change liquid to solid.

Hives: Bees bring in water to hive and fan wings so air goes across droplet of water and air cools.

Swamp coolers: an alternative to air conditiong. Dry air with low humidity produces best effects because air takes up water.

Sweating: Similar to hives and swamp coolers, your body produces sweat to be evaporated producing a cool sensation. If the air is humid, the sweat takes longer to evaporate.

Making Ice: The sugar cane and corn are good conductors and also allow a passage of air around the pans of water. We are curious about the wind and how the temperature is not at the freezing point. The passage of air allows evaporation to occur, helping to freeze the water. The evaporation occurs outside the pan, cooling the environment around the water in the pan.

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